Cooch, Frank A., IV EXHIBIT D

From: Carlson, Micah A.
Sent: Monday, November 26, 2001 2:58 PM
To: McLoughlin, Michael P.
Subject: Daily log

Log book.doc (64 KB)

Here are my notes from what we have been doing down here. Please feel free to change it as you see fit.

Micah

EXHIBIT D

(1)

Log for Contaminated Mail Detection System

Date: November 13, 2001

Configuration Notes:

Ho de Ho of He de He asked JHU/APL to show up at a newly created mail processing facility. The goal at this facility is to process mail through several steps in an attempt to eliminate contaminated mail from reaching the final destination. This detection system should be able to detect both real and hoax deliveries.

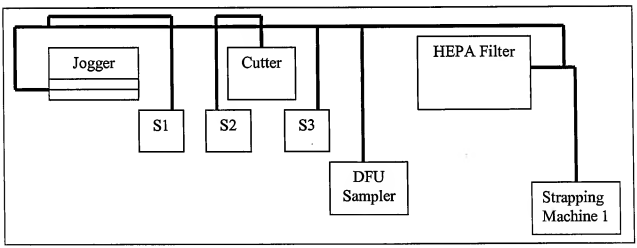
The general process outlined for the processing included;

1. Cut the corner of the envelope
2. Jog the cut envelope to shake any additional powder out
3. Strap the cut and jogged mail to send back to the sorting facility.

At this time, all mail coming through the facility has been irradiated at the Ohio processing facility and is deemed neutralized.

Steps Taken:

Prior to processing any mail, initially 1 then 3 Climet Particle counters were configured in the 3 locations shown in Figure 1 below (indicated as S1 to S3).



Day 1 sampling was configured to primarily test the viability of using a sampler located only at the cutting location. Pre-jogging time frames and protocol were determined to move all particulate within the envelope to a single corner. The original concept included jogging the envelope to move the material to a corner that can be sliced open, thus dispensing all material within the envelope. Ideally a slug of material could be easily detected by monitoring this location. Hence, Day 1 trials served to test this hypothesis in addition to validating Climet data against a TSI Aerodynamic Particle Sizer Spectrometer. Results of Day 1 testing indicated that the Climet particle count data matched closely with the APS particle data. In addition, the sampling indicated that there

was little difference between cutting "contaminated" and "uncontaminated" envelopes. Hence, for day 2 testing a more extensive distribution of equipment was used to attempt to locate an indicative particle count at another location within the exhaust stream from the machines.

General Process:

The experiments included obtaining data from the following configurations

1.) Baseline operation of the cutter and shaker without any mail present
2.) Baseline shaker operation with Mail present while the cutter ran without mail.
3.) Uncontaminated mail samples in the jogger and being cut at a pace of ~1 stack per 10 seconds
4.) Jogging of precut uncontaminated mail.
5.) Jogging of mail with 1 contaminated envelope. (1/4 gram Bentonite)
6.) Cutting of mail with and without actual contaminated envelope.
7.) Jogging of precut contaminated mail.
8.) Jogging and cutting of uncontaminated mail after contaminated mail was processed.
9.) Cleaning of equipment with pressurized air source.

Bentonite with a median distribution around 2.5 micron was placed in envelopes with ½ to ¼ gram as the simulated contaminant. These envelopes were mixed in with "dummy" mail that was provided as clean mail.

General Recommendations:

From powder distribution experiments done on simulated contaminated envelopes it appeared that it may be wise to jog, cut and jog again. The first jogging step would move all material to the corner where it would be cut creating a burst of powder to be detected. Additionally, the jogging protocol consisted of jogging the mail horizontal followed by vertical to attempt to move all material to the corner. Triggering algorithms were beginning to be developed based on results.

Date: November 14, 2001

Configuration Notes:

No new information was provided.

Steps Taken:

Particle counters were configured at the three locations indicated in Figure 1 above. Additionally flow rates were measured through the shaker at the minimum and maximum expected flow rates. More mail was cut and jogged with and without simulated contaminate envelopes at the two different flow rates.

General Recommendations:

Minimal rise in particle counts on Sampler 2 (downstream of the cutter) were measured. This suggests that most of the material may be retained in the crimped edge and lost as the corner falls down a chute in back. Additionally there was minimal difference in the particle counts derived from clean and contaminated mail. Inspection of the setup and observations indicated that jogging contaminated mail increased the particle counts in the room dramatically. Hence, particles were coming out but they were not being drawn into the HEPA filter. A cover for the Jogger was recommended to draw air over the top of the mail and capture any free floating contaminant stemming from the envelope. Additionally we recommended a jogger on a 45 degree angle to eliminate the dual rotations required.

Date: November 15, 2001

Configuration Notes:

A new jogger with the cover was delivered. Dalgren sheet metal benders created the general design. The jogger sat the envelopes on a 45 degree angle and had a cover. The material was substantially thicker to reduce noise caused by metal on metal contact.

Steps Taken:

More experiments with uncontaminated mail and interspersed contaminated envelopes were continued. Software for triggering on high particle counts and on a percent increase were developed.

Results:

Results from the afternoon experiments are shown in Figure 2 below.

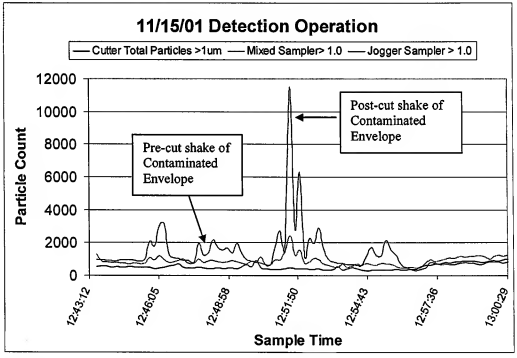


Figure 2 Figure 2 shows the results from a good detection experiment showning both the precut shake and the post cut shake of a set of mail with a contaminated envelope.

General Recommendations:

New jogger seemed to be working well to capture particulates. Initial experiments looked excellent however, results seem to be inconsistent. It appears that the increased weight of the jogger does not transfer the material as readily. The cover with a new cutout works to retain aerosolized particulates, validated with a sniffing tube, but the jogging is not violent enough to adequately move particulate. We recommended a

smaller jogger with a larger envelope compartment. This will allow processing of larger mail items with less overall weight.

Date: November 20, 2001

Configuration Notes:

Jogger Design #3 was delivered. Basic configuration included a 45 degree back angle, a 30 degree side angle and a 22 inch tray with a cover. This jogger was lighter and was believed to be a good design. Again, Dalgren sheet metal benders created the general design following our recommendations. Additionally, we enclosed the cutter with a small hood to eliminate any potential particles generated during the cutting process.

Real mail was delivered and we began by processing all the "standard mailings" from large organizations. This represented the first time that we processed some "real mail". The goals were to determine typical particulate levels from standard mail.

Steps Taken:

More experiments with uncontaminated mail and interspersed contaminated envelopes were continued. Software for triggering on high particle counts and on a percent increase were implemented. General testing indicated a trigger level of ~7X ambient background counts would be good. We have dermined that different levels of particulates can be expected. We have not determined if this is due to variations in mail or in the Climet particle counters. At times when the contaminated envelope is jogged well, particle counts can easily exceed 25000 particles over a 12 second sample. Generally background particle counts from uncontaminated mail does not exceed 5000 particles per 12-second sample.

Results

During experimentation we again determined that the jogger was not providing consistent results. By grabbing and rotating the whole unit we could get the repeatable results that we desired. These results are clearly shown in Figure 3 below.

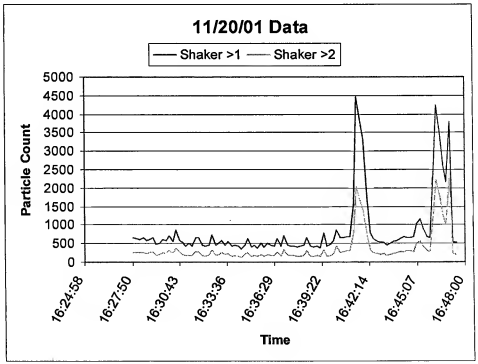


Figure 3 Figure shows shaking of contaminated and uncontaminated mail. The sharp peaks are due to physically squeezing the jogger with a contaminated set of envelopes in place, thereby amplifying the amplitude.

General Recommendations:

S3 was replaced with a Slit Sampler that will be run during preliminary experiments. A filter sample was run during the day and will be sent to USAMRIID for processing as an additional safety measure. Conversations with whoha Mail Superintendant, Alan Stone suggested that the strapping machines were going to be a problem and were only recommended to help in the removal or detection of particulate matter from the envelopes. They would provide one last squeeze prior to delivery. From our results we recommended incorporating the squeezing procedure into the final step of the jogger. This would allow removal of the strapping machines, and elimination of a step to remove the strapping prior to sorting. Since all data indicates detection may be done at the Jogger we suggested this and as a result strapping will be removed from the process.

Date: November 21, 2001

Configuration Notes:

Detailed focus on the Jogger behavior to increase jogging and improve particle transfer from the bottom to the corner during the jogging process.

Steps Taken:

Went back to Jogger design 1 and added a cover of a thin material. Looked into increasing the amplitude of the jogging motion further. Developed further detection algorithms to detect on an increase over a moving average to prevent absolute count false alarms.

Results:

Taking the system apart revealed several problems not seen before including a significant particle buildup in the plenum under the mail platform and in the ducting back to the HEPA filter. We sketched out a new jogger design to

1.) Eliminate sideways angle allowing free shaking of all envelopes instead of the compression caused on inner envelopes by outer envelope weight.
2.) Shake envelopes only in the vertical orientation on a 60 degree angle to eliminate the spring caused by the 45 degree interface plate.
3.) Lighten the overall design to prevent damping
4.) Sample prior to forcing all flow around a corner
5.) Modify the cantilevered design to increase contact between the jogger and envelope compartment.

In addition we detailed a new configuration enclosing both the cutter and the jogger inside a hood. This should prevent ambient particle drift found during manually moving envelopes from the cutter to the Jogger. We also detected a real contaminated envelope through manual inspection not by the cutting and jogging processes. It was given to the FBI for further analysis.